

## AMENDMENTS TO THE CLAIMS

The listing of the claims will replace all prior versions, and listings, of claims in the application:

### LISTING OF CLAIMS:

1. (currently amended): A method for analyzing multivariate images, comprising:
  - a) providing a data matrix  $\mathbf{D}$  containing measured spectral data,
  - b) transforming the data matrix  $\mathbf{D}$ , using a wavelet transform, to obtain a transformed data matrix  $\tilde{\mathbf{D}}$ ,
  - c) thresholding the wavelet coefficients of the transformed data matrix  $\tilde{\mathbf{D}}$ ,
  - d) performing an image analysis on the transformed data matrix  $\tilde{\mathbf{D}}$  to obtain a transformed spatially compressed concentration matrix  $\tilde{\mathbf{C}}$  and a spectral shapes matrix  $\mathbf{S}$ , and
  - e) computing a concentration matrix  $\mathbf{C}$  from the transformed spatially compressed concentration matrix  $\tilde{\mathbf{C}}$ .
2. (currently amended): The method of Claim 1, wherein the data matrix  $\mathbf{D}$  comprises a total of  $j$  blocks of data  $\mathbf{D}_i$ , each data block  $\mathbf{D}_i$  thereby providing a concentration block  $\mathbf{C}_i$  in step [[a)] e), and wherein steps a) through [[d)] e) are repeated sequentially until the concentration matrix  $\mathbf{C}$  is accumulated blockwise, according to  $\mathbf{C} = [\mathbf{C}_1 \quad \mathbf{C}_2 \quad \dots \quad \mathbf{C}_{j-1} \quad \mathbf{C}_j]$ .
3. (original): The method of Claim 1, wherein the wavelet transform comprises a Haar transform.
4. (canceled)
5. (currently amended): The method of Claim [[4]] 1, wherein the thresholding comprises decimating the detail coefficients.
6. (currently amended): The method of Claim 1, wherein the image analysis of step [[c)] d) comprises an alternating least squares analysis and the transformed

spatially compressed concentration matrix  $\tilde{\mathbf{C}}$  and the spectral shapes matrix  $\mathbf{S}$  are obtained from a constrained least squares solution of  $\min_{\tilde{\mathbf{C}}, \mathbf{S}} \|\tilde{\mathbf{D}} - \tilde{\mathbf{C}}\mathbf{S}^T\|_F$ .

7. (original): The method of Claim 6, wherein the alternating least squares analysis comprises a transformed non-negativity constraint.
8. (currently amended): The method of Claim 1, wherein the computing step [(d)] e) comprises applying an inverse wavelet transform to the ~~transformed~~ spatially compressed concentration matrix  $\tilde{\mathbf{C}}$  to provide the concentration matrix  $\mathbf{C}$ .
9. (currently amended): The method of Claim 1, wherein the computing step [(d)] e) comprises projecting the data matrix  $\mathbf{D}$  from step a) onto the spectral shapes matrix  $\mathbf{S}$  from step [(c)] d), according to  $\min_{\mathbf{C}} \|\mathbf{D} - \mathbf{C}\mathbf{S}^T\|_F$ .
10. (currently amended): A method for analyzing multivariate images, comprising:
  - a) providing a data factor matrix  $\mathbf{A}$  and a data factor matrix  $\mathbf{B}$  obtained from a factorization of measured spectral data  $\mathbf{D}$ ,
  - b) transforming the data factor matrix  $\mathbf{A}$ , using a wavelet transform, to obtain a transformed data factor matrix  $\tilde{\mathbf{A}}$ ,
  - c) thresholding the wavelet coefficients of the transformed data factor matrix  $\tilde{\mathbf{A}}$ ,
  - e) d) performing an image analysis on the transformed data factor matrix  $\tilde{\mathbf{A}}$  and data factor matrix  $\mathbf{B}$  to obtain a ~~transformed~~ spatially compressed concentration matrix  $\tilde{\mathbf{C}}$  and a spectral shapes matrix  $\mathbf{S}$ , and
  - e) e) computing a concentration matrix  $\mathbf{C}$  from the ~~transformed~~ spatially compressed concentration matrix  $\tilde{\mathbf{C}}$ .
11. (currently amended): The method of Claim 10, wherein the data factor matrix  $\mathbf{A}$  comprises a total of  $j$  blocks of data factors  $\mathbf{A}_i$  and the data factor matrix  $\mathbf{B}$  comprises  $k$  blocks of data factors  $\mathbf{B}_i$ , thereby providing a concentration block  $\mathbf{C}_i$

in step ~~[[d]]~~ e), and wherein steps a) through ~~[[d]]~~ e) are repeated sequentially until the concentration matrix **C** is accumulated blockwise, according to

$$\mathbf{C} = [\mathbf{C}_1 \quad \mathbf{C}_2 \quad \cdots \quad \mathbf{C}_{j-1} \quad \mathbf{C}_j].$$

12. (original): The method of Claim 10, wherein the wavelet transform comprises a Haar transform.

13. (canceled)

14. (currently amended): The method of Claim ~~[[13]]~~ 10, wherein the thresholding comprises decimating the detail coefficients.

15. (currently amended): The method of Claim 10, wherein the image analysis of step ~~[[c]]~~ d) comprises an alternating least squares analysis and the ~~transformed~~ spatially compressed concentration matrix  $\tilde{\mathbf{C}}$  and the spectral shapes matrix **S** are obtained from a constrained least squares solution of  $\min_{\tilde{\mathbf{C}}, \mathbf{S}} \|\tilde{\mathbf{A}}\mathbf{B}^T - \tilde{\mathbf{C}}\mathbf{S}^T\|_F$ .

16. (original): The method of Claim 15, wherein the alternating least squares analysis comprises a transformed non-negativity constraint.

17. (currently amended): The method of Claim 10, wherein the computing step ~~[[d]]~~ e) comprises applying an inverse wavelet transform to the ~~transformed~~ spatially compressed concentration matrix  $\tilde{\mathbf{C}}$  to provide the concentration matrix **C**.

18. (currently amended): The method of Claim 10, wherein the computing step ~~[[d]]~~ e) comprises projecting the product of the data factor matrix **A** and the data factor matrix **B** from step a) onto the spectral shapes matrix **S** from step ~~[[c]]~~ d), according to  $\min_{\mathbf{C}} \|\mathbf{A}\mathbf{B}^T - \mathbf{C}\mathbf{S}^T\|_F$  and subject to appropriate constraints.

19. (original): The method of Claim 10, wherein the data factor matrix **A** comprises a scores matrix **T** and the data factor matrix **B** comprises a loadings matrix **P**, and wherein **T** and **P** are obtained from a principal components analysis of the measured spectral data **D**, according to  $\mathbf{D} = \mathbf{TP}^T$ .

20. (original): The method of Claim 19, wherein **T** and **P** represent the significant components of the principal components.
21. (new): The method of Claim 1, wherein the data matrix **D** is weighted.
22. (new): The method of Claim 10, wherein the data factor matrix **A** and the data factor matrix **B** are weighted.